



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,202	04/11/2001	Jameel Menashi	01023	1699

7590

03/31/2003

Martha Ann Finnegan, Esq.
CABOT CORPORATION
Billerica Technical Center
157 Concord Road
Billerica, MA 01821-7001

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/833,202

Applicant(s)

MENASHI, JAMEEL

Examiner

Raymond Alejandro

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 2,9,11-13,15 and 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,10 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6-7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I (claims 1-10 and 14) and Species I (directed to an electrode comprising the modified carbon, claims 1, 3-8, 10 and 14) in Paper No. 10 is acknowledged. The traversal is on the ground(s) that "there is no serious burden on the examiner and that a search can easily be achieved" and as to the Election of Species that "all species should be examined at the same time and that there is no need to have an Election of Species". This is not found persuasive because the particular search for the elected claims is not required for non-elected claims, that is, the search required for the fuel cell comprising the specific carbon modified electrode is not particularly required for both methods to reduce the thickness of a solid electrolyte membrane and for increasing catalyst accessibility in an electrode. As admitted by the applicants, the inventive concepts involve both the fuel cell per se and both methods. However, since the restriction requirement has been treated as process of making and product made, it is further noted that the inventions are distinct because the method to reduce the thickness of a solid electrolyte membrane and the method for increasing catalyst accessibility in an electrode can be used to make other and materially different product such as electroplating cells, sodium chloride electrolysis devices, biosensors, gas sensors and the like, that is to say, one is related to the product per se while the other is directed to a methodology to reduce thickness and/or increasing catalyst accessibility. Accordingly, serious burden would be raised if the search of both different methods was made as required for the separate and distinct inventions.

With respect to both species, it is noted that as admitted by the applicant and disclosed in the specification, a first embodiment includes an electrode comprising the modified carbon

Art Unit: 1745

while the second embodiment comprises the solid electrolyte membrane comprising the modified carbon. Thus, the disclosure encompasses two different and separated embodiments which are mutually exclusive. Accordingly, serious burden would be raised if the search of both different methods was made as required for the separate and distinct inventions.

The requirement is still deemed proper and is therefore made FINAL.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 11/15/01 and 11/20/01 (papers # 6-7, respectively) was considered by the examiner.

Drawings

3. The drawings filed on 04/11/01 are acceptable.

Specification

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686

Art Unit: 1745

F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1, 3-8, 10 and 14 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-8, 10 and 14 of copending Application No. 10/112689 (**Patent Application Publication US 2003/0017379**).

Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The copending application No. 10/112689 (**Pub. No. US 2003/0017379**) claims the following (see claims 1, 3-8, 10 and 14):

1. A fuel cell comprising a gas diffusion electrode, a gas diffusion counter-electrode, a solid electrolyte membrane located between the electrode and counter-electrode, wherein the electrode or the counter-electrode or both comprise at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group, wherein said carbon product is a silicon-treated carbon black or a metal-treated carbon black.

3. The fuel cell of claim 1, wherein said gas diffusion electrode and gas diffusion counter-electrode each comprise a blocking layer and an active layer.

4. The fuel cell of claim 3, wherein said active layer or said blocking layer or both comprise at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group.

5. The fuel cell of claim 3, wherein said active layer has a thickness of less than about 10 microns.

Art Unit: 1745

6. The fuel cell of claim 3, wherein said active layer comprises at least one modified carbon product, wherein said modified carbon product comprises a carbon product having attached at least one organic group and a metal catalyst.

7. The fuel cell of claim 3, wherein said active layer has no fluoropolymer binder present.

8. The fuel cell of claim 1 wherein said solid electrolyte membrane comprises polytetrafluoroethylene.

10. The fuel cell of claim 1, wherein said organic group is $-\text{C}_6\text{H}_4\text{SO}_3^-$.

14. The fuel cell of claim 1, wherein said organic group is a proton conducting group, an electron conducting group, or both.

In this case, it is noted that the instant application claims (S/N 09/833202, namely, first application) is broader or more generic than the claims of the copending application (S/N 10/112689, namely, second application), thus, the first application claims are anticipated by the second application. In re Goodman. Accordingly, a claim containing a broad limitation is anticipated by another claim containing a narrow limitation which lies within the broad range. For instance, the claims of the copending application 10/112689 are considered to contain a narrower scope as such claims are further reciting that the carbon product is a silicon-treated carbon black or a metal-treated carbon black.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 1745

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 3-8, 10 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Yu et al 6399202.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

The instant application is drawn to a fuel cell wherein the claimed inventive concept comprises an electrode comprising at least one modified carbon product having specific group attached thereto. Other limitations include the specific blocking layer and active layer; the binder-free active layer; the specific solid electrolyte membrane; and the specific organic group.

As to claim 1:

Yu et al disclose gas diffusion electrodes containing modified carbon products wherein the modified carbon product is a carbon product having attached at least one organic group (abstract). It is further disclosed that the Yu et al's invention relates to gas diffusion electrodes such as the ones used in fuel cells and also relates to modified carbon products used to form one or more components of the gas diffusion electrodes (col 3, lines 44-49/ col 3, lines 56-60). It is disclosed that gas diffusion electrodes prepared with modified carbon material have broad applications, one example of a gas diffusion electrode application would be a phosphoric acid

Art Unit: 1745

type fuel cell using a pair of gas diffusion electrodes or for solid polymer electrolyte fuel cells (col 8, lines 45-50 & line 54). It is noted that Yu et al mentions publications in which they all are incorporated in their entirety by reference (col 8, lines 45-61). In addition, it is mentioned that the present invention can also be used in fuel cells; wherein each of these applications can incorporate the modified carbon material of the present invention in the electrode to obtain the discussed benefits (col 9, lines 3-4 and lines 8-13). In view of this, it is inherent that a fuel cell should at least comprise two electrodes and an electrolyte to satisfy mechanical, chemical and kinetic requirements (basic components) so as to obtain a fully functional or working fuel cell which converts electrochemical energy into electrical energy.

As previously mentioned, in particular, it is noted that Yu et al in column 2, lines 19-30 and 53-65 incorporates in its entirety by reference the teachings of Dirven et al 5561000 who discloses a gas diffusion electrode for an electrochemical cell with solid electrolyte (ABSTRACT of Dirven et al'000 which is incorporated by reference). It is further disclosed that a fuel cell is mainly composed of the assembly of a cathode, an anode and in between them a solid electrolyte membrane (col 3, lines 7-11 of Dirven et al'000 which is incorporated by reference).

As to claim 3:

It is disclosed that the modified carbon product can be used for at least one component of electrodes such as the active layer and/or the blocking layer (abstract). It is disclosed that with respect to air diffusion electrode which is generally used in fuel cells, this type of electrode generally is constructed to have a blocking layer and an active layer (col 3, lines 62-65).

As to claim 4:

Art Unit: 1745

It is disclosed that the blocking layer, the active layer or both contain at least one modified carbon product; thus, it is preferred that the modified carbon product comprise at least one carbon product having attached at least one organic group (col 4, lines 31-47).

As to claim 4, 6:

It is disclosed that with respect to the active layer, preferably the active layer contains a modified carbon product wherein the carbon product preferably has attached at least one type of hydrophobic organic group (col 4, line 66 to col 5, line 10). Yu et al also disclose a gas diffusion layer wherein a catalytic layer is formed on a porous back support by mixing catalyst particles of Pt (col 2, lines 50-57); wherein in some cathode structures the solution is made of PT/C catalyst powder (col 2, lines 62-65). It is further noted that Yu et al's teaching refers to a technique disclosed by US patent 5,561,000 which is incorporated in its entirety by reference herein (col 2, lines 19-21 and 50-65). *Thus, Yu et al's teaching fully encompasses the teachings of the '000 patent.*

With respect to claim 5:

It is noted that Yu et al in column 8, lines 38-61 incorporates in its entirety by reference the teachings of Cabasso et al 5783325 who discloses electrolytic gas diffusion electrodes for fuel cells (ABSTRACT of Cabasso et al'325 which is incorporated by reference) wherein the active catalytic layer has a thickness between about 7 μm and about 50 μm (col 4, lines 50-56 of Cabasso et al'325 which is incorporated by reference). It is noted that the disclosed thickness range, particularly from 7-10 μm , falls within the instantly claimed range. *Accordingly, this thickness magnitude provides good performance, provides a gas diffusion electrode with favorable chemical and electrical properties for fuel cells, provides a gas diffusion electrode*

Art Unit: 1745

with a controlled electrode structure, porosity and size making it possible to formulate each structure with properties that are most suitable for its function.

As to claim 7:

It is disclosed that one preferred advantage of the present invention is the ability to reduce such fluorine containing compounds in the blocking layer or active layer; the proper choice of organic groups attached onto the carbon product to form the modified carbon product can lead to a decrease if not an elimination of fluorine containing compounds (col 7, line 23-35); such fluorine containing compounds typically used are polytetrafluoroethylene and/or perfluoric sulphonic acid polymer (col 7, lines 17-21).

Regarding claim 8:

It is noted that Yu et al in column 2, lines 19-30 and 53-65 incorporates in its entirety by reference the teachings of Dirven et al 5561000 who discloses gas diffusion electrode with catalyst for an electrochemical cell with solid electrolyte (ABSTRACT of Dirven et al'000 which is incorporated by reference) wherein the electrolyte is made of an ion exchange polymer or ionomer such as polytetrafluoroethylene (col 3, lines 32-40 of Dirven et al'000 which is incorporated by reference). It is taught that solid electrolyte membranes are made of an ion exchange polymer or ionomer because such material is very suited (col 3, lines 32-40 of Dirven et al'000 which is incorporated by reference).

As to claim 10:

It is disclosed that said organic group is $\text{p-C}_6\text{H}_4\text{SO}_3\text{Na}^+$ (claim 9). Thus, this specific ionic organic group comprises the instantly claimed organic group.

As to claim 14:

It is disclosed that the functional groups forming anions are ionizable (col 5, lines 15-16) and it is understood that cationic counter ions can be exchanged to other ions through an ion-exchange process (col 5, lines 42-44). Examples of ionizable functional groups that form cationic groups are disclosed (col 5, lines 15-40; col 5, line 57 to col 6, line 15). *Thus, it should be recognized that the organic group is either a proton conducting group or electrode conducting group.*

Thus, the claims are anticipated.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro
Examiner
Art Unit 1745

